1. (Currently Amended) An integrated gas sensor, comprising a gas-sensitive semiconductor film in contact with at least one contact electrode, a field electrode being disposed under the gas-sensitive semiconductor film and disposed above and electrically in contact with a semiconductive substrate, and an insulator layer disposed in between the field electrode and the gas-sensitive semiconductor film, where the insulator layer has a thickness that is less than or equal to approximately ~~ten times~~ the Debye length $L_D$ of the gas-sensitive semiconductor film and corresponding to the insulator layer, where the Debye length $L_D$ is given by:

$$L_D = \sqrt{\frac{\varepsilon\varepsilon_0 kT}{q^2 N}}$$

where T is the temperature, ε is the relative permittivity of the material of the gas-sensitive semiconductor film, $\varepsilon_0$ is the absolute permittivity, k is the Boltzmann constant, N is the charge-carrier concentration and q is the elementary charge.

2. (Cancelled)

3. (Cancelled)

4. (Previously Presented) The integrated gas sensor of claim 1, where the field electrode comprises a plurality of microstructured field electrodes.

5. (Previously Presented) The integrated gas sensor of claim 4, where each one of the microstructured field electrodes is individually drivable.

6. (Previously Presented) The integrated gas sensor of claim 1, further comprising at least one heater electrode, the heater electrode being integrated with the gas sensor.

7. (Previously Presented) The integrated gas sensor of claim 1, further comprising driver electronics, the driver electronics being integrated with the gas sensor.

8. (Previously Presented) The integrated gas sensor of claim 7, where the driver electronics comprise a temperature control.

9. (Previously Presented) The integrated gas sensor of claim 1, where the thickness of the gas-sensitive semiconductor film is at most approximately one-hundred times greater than a Debye length of the gas-sensitive film.

10. (Previously Presented) The integrated gas sensor of claim 4, where the spacing between the plurality of the microstructured electrodes is on the order of a grain size of the gas-sensitive semiconductor film.

11. (Previously Presented) The integrated gas sensor of claim 1, where the gas-sensitive semiconductor film comprises $SnO_2$.

12. (Currently Amended) A gas sensor, comprising:

a semiconductive substrate;

a gas-sensitive semiconductor film;

at least one contact electrode in electrical contact with the gas-sensitive film;

an insulator layer disposed next to the gas-sensitive semiconductor film; and

at least one field electrode disposed between ~~next to~~ the insulator layer and ~~above and electrically in contact with~~ the semiconductive substrate;

where the insulator layer has a thickness that is less than about ~~ten times~~ a Debye length $L_D$ of the gas-sensitive semiconductor film.

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Previously Presented) The gas sensor of claim 12, where the insulator layer has a thickness that is approximately equal to the Debye length $L_D$ of the gas-sensitive semiconductor film.

17. (Previously Presented) The gas sensor of claim 12, where the at least one field electrode comprises a plurality of field electrodes.

18. (New) The gas sensor of claim 12, further comprising at least one heater electrode, the heater electrode being integrated with the gas sensor.

19. (New) A semiconductor gas sensor, comprising:

a semiconductive substrate;

at least one field electrode deposited onto the semiconductive substrate and adapted to generate an electric field;

a gas-sensitive layer;

an insulator layer located between the gas-sensitive layer and the at least one field electrode, adapted for propagating the electric field from the field electrode to a surface of the gas-sensitive layer; and

at least one contact electrode electrically in contact with the gas-sensitive layer;

where the insulator layer has a thickness that is less than about a Debye length $L_D$ of the gas-sensitive semiconductor layer.